ing on the magnitude and direction of the longitudinal force. In some embodiments, the control system selectively activates the motor, that is, it does not activate the motor if the one or more sensors sense that a rotational force has been applied to the moment arm.

[0019] In accordance with another aspect of the invention as may be implemented in various embodiments, an apparatus is provided for providing a gyroscopically-responsive power assist to a user for carrying a load. The apparatus includes a pair of frame support members. An elongated wheel support member transversely couples the pair of frame support members along a horizontal axis. A pivot is centrally located relative to the wheel support member, in which the pivot provides rotation of the wheel support member around the horizontal axis. The apparatus further includes a single wheel rotatably mounted about a rotation axis which is substantially perpendicular to the horizontal axis, the wheel being coupled to the pivot, disposed between the frame support members, and extending at least partially below the frame support members.

[0020] Continuing with this second aspect of the invention, the apparatus includes a motor connected to drive the wheel when energized. Additionally, the apparatus includes a sensor. Finally, the apparatus includes a gyroscopic fore-and-aft balance control system configured to output an energized signal for controlling power being provided to energize the motor. The balance control system activates or deactivates the motor using the energized signal by sensing at the sensor whether a vertical force which causes the wheel support member to rotate around the horizontal axis has been applied to the frame support members, and in which the balance control system instructs the motor to accelerate or decelerate the wheel in accordance with the direction and magnitude of a longitudinal force applied to the frame support members as the vertical force is simultaneously applied.

[0021] These and other aspects, features and advantages will be apparent from the following description of certain embodiments of the invention.

DETAILED DESCRIPTION OF CERTAIN EMBODIMENTS OF THE INVENTION

[0022] The invention is now described with reference to the accompanying drawings, which form a part hereof, and which show, by way of illustration, example implementations and/or embodiments of the present invention. It is to be understood that other embodiments can be implemented and structural changes can be made without departing from the spirit of the present invention. Among other things, for example, the disclosed subject matter can be embodied as methods, devices, components, or systems.

[0023] Furthermore, it is recognized that terms can have nuanced meanings that are suggested or implied in context beyond an explicitly stated meaning. Likewise, the phrase "in one embodiment" as used herein does not necessarily refer to the same embodiment and the phrase "in another embodiment" as used herein does not necessarily refer to a different embodiment. It is intended, for example, that claimed subject matter can be based upon combinations of individual example embodiments, or combinations of parts of individual example embodiments.

[0024] The arrangement in certain embodiments provides a moment arm that extends from a pivot point in order to impart a drive force to a gyroscopically-responsive power assist motor, and, in the disclosed embodiments, provides improvements to transport devices by providing such structures. In accordance with a salient aspect of the present invention, a force is received along the direction of intended transport, which is sensed by a sensor that in turn outputs an energized signal to a motorized wheel, to activate the wheel in the direction of the intended transport. The sensor can be selectively responsive to signals. For instance, the sensor can be configured to respond to a sensed rotational or pivoting force by suppressing control or energize signals to the motor, or by sending signals that have the effect of controlling the motor or otherwise deenergizing it so that the wheel is not driven into motion. The present invention provides embodiments that include a controller configured to differentiate between longitudinal and rotational forces in order to advantageously enable an unload operation while the motor-driven wheel is not energized. As such, the load device is not translated forward or backward in response to certain forces applied to a moment arm, whereas it is responsive to other forces applied to the same moment arm. Without loss of generality, the controller in an apparatus constructed in accordance with certain aspects of the invention is configured to selectively activate and assist transport upon reception of a longitudinal force at a distance from the sensor, for instance, while not activating or otherwise causing a power-assist drive to the wheel if such force is of the rotational or pivoting type.

[0025] The previously described versions of the present invention have many advantages including, in one aspect, a motor capable of driving a wheel without requiring a load to shift substantially above the gyroscopic-responsive sensor. More specifically, the invention contemplates a rigid coupling of a moment arm to a pivot, in which a load is supported at least partially above the moment arm. Activation of the motor can be accomplished without requiring the load to shift around the pivot point. For example, unlike a gyroscopic self-balancing user transport vehicle in which a load is disposed above the motorized wheel, and in which the vehicle's wheel is driven as the load leans in a travel direction, the present invention does not require a load to lean or shift.

[0026] Aspects of the invention can be appreciated in regard to the following discussion which is provided in the context of a wheelbarrow, in accordance with one or more exemplary embodiments. More generally, the invention can be implanted in a vehicle in which there is a moment arm connected to a pivot to provide a gyroscopic-responsive power assist to a motor in order to drive a wheel, which can be to the single wheel of a wheelbarrow as in the disclosed embodiments. It will be appreciated, however, that the invention is not limited to the confines of the wheelbarrow arts, but rather can be employed in vehicles having one or more wheels, including at least one wheel driven by a gyroscopically-responsive controller. The wheelbarrow example is provided as one arrangement in which a load is seated generally above the wheel, yet motor activation is not at all dependent upon shifting the load during any tipping or pivoting of the load, but rather, is due to a force applied remotely at the end of a moment arm.

[0027] In one or more embodiments, a gyroscopic sensor is provided to output signals to a motor which drives a wheel. A gyroscopic sensor can sense forces received (e.g., longitudinal or rotational forces) by the apparatus and regulate the motor accordingly in order to drive or not the wheel.